

# Index

Reactor and Fuel-Processing Technology

# Volume 11

Note: The page range for each of the four issues of Vol. 11 is as follows:

No. 1, pages 1 to 68	No. 3, pages 117 to 166
No. 2, pages 69 to 116	No. 4, pages 167 to 231

## A

- Accidents**
  - analysis of nuclear in fast reactors, 1-3
  - electrical cable fire in Peach Bottom Reactor during construction, 6
  - superheating of liquid-metal coolants in fast reactors, 84-88
- Actinide oxides**
  - electrolytic deposition from molten alkali-metal chlorides, 99-100
- Allied Chemical Corporation**
  - plans for new fuel-processing plant, 205
- Aluminum**
  - fast-neutron-induced bowing of ORR components, 18-20
- Aluminum (SAP)**
  - dissolution, 49
- Aluminum alloys (Al-Cd)**
  - fast-neutron-induced bowing of safety shim rods in ORR, 18-20
- Aluminum alloys (Al-U)**
  - dissolution by HNO<sub>3</sub>, effect of Si on, 201
- Aluminum alloys (Al-U)(Al clad)**
  - fluoride-volatility processing of, 103-4
- Aluminofluoride (AlF<sub>3</sub>)**
  - enthalpy of formation, 106
- Americium**
  - distribution between liquid Pu and NaCl-KCl containing PuCl<sub>3</sub>, 224
  - preparation from AmO<sub>2</sub>, 158
  - recovery from Pu by electrorefining, 224
  - recovery from Shippingport Reactor fuel, 202-3
  - solvent extraction, 51
- Aquafluor process**
  - processing of stainless-steel-clad UO<sub>2</sub> fuels, 54-56
  - processing of zirconium-clad UO<sub>2</sub>, 54-56
- Aqueous processing**
  - Am recovery from Shippingport Reactor fuel, 202-3
  - of BeO-based fuels, 144-45
  - corrosion in processing Zr-type fuels with HF, 202
- Cm recovery from Shippingport Reactor fuel, 202-3**
- decladding and dissolution of Shippingport blanket elements, 93-94**
- decladding of SAP-clad UC and UO<sub>2</sub> fuels, 49**
- design of delayed-neutron monitor for <sup>235</sup>U in leached hulls, 205-8**
- design of modular pilot plant, 146-47**

- design and operation of stacked-clone liquid-liquid contactors, 51-53**
- dissolution of PuO<sub>2</sub>, 91**
- dissolution of pyrolytic carbon-coated (Th,<sup>232</sup>)C<sub>2</sub> and (Th,U)O<sub>2</sub> particles, 92-93**
- dissolution of ThO<sub>2</sub>, 91-92**
- dissolution of U-Al alloys, effect of Si on, 201**
- dissolution of UO<sub>2</sub> pellets containing Mo, 92**
- dissolution of Zircaloy-clad ZrO<sub>2</sub>-UO<sub>2</sub> fuel, 93**
- of EBR-II fuel elements, 201-2**
- Pu recovery from Purex wastes, 203**
- performance of centrifugal mixer-settler, 205**
- Pu recovery from Purex wastes, 203**
- process flowsheet for WAK fuel processing plant, 94-95**
- solvent extraction of actinide elements, 50-51**
- solvent extraction of ground graphite-base fuels, 94**
- of stainless-steel-clad UO<sub>2</sub>-PuO<sub>2</sub> fuels, 50**
- symposium on, 146**
- Arsenic fluoride (AsF<sub>3</sub>)**
  - structure, 105-6
- Asphalt**
  - waste incorporation in, 67-68, 109
- Attila cell**
  - design and operation, 103-4

## B

- Beryllium**
  - electrorefining, 224
- Beryllium alloys (Be-Cd)**
  - fast-neutron-induced bowing of safety shim rods in ORR, 20
- Beryllium fluoride systems (BeF<sub>2</sub>-LiF-ThF<sub>4</sub>)**
  - pyrochemical processing, 61-63, 99, 156-57, 221-24
- Bibliographies**
  - on fission-product recovery from wastes, 231
  - on nonaqueous processing of spent fuels, 216
- Burnup**
  - prediction in thermal-reactor fuels, 69-71

## C

- Cadmium alloys (Al-Cd)**
  - fast-neutron-induced bowing of safety shim rods in ORR, 18-20
- Cadmium alloys (Be-Cd)**
  - fast-neutron-induced bowing of safety shim rods in ORR, 20
- Californium-252**
  - production estimate, 50
- Cesium**
  - removal from liquid wastes by solvent extraction, 111-12, 230
- Chalk River Nuclear Laboratories**
  - waste management, 164
- Chlorine fluoride (ClF<sub>3</sub>)**
  - preparation, 105
- Conferences and meetings**
  - Disposal of Radioactive Wastes into the Ground, Vienna, 1967, 230
  - International Conference on Fast Reactor Safety, Aix-en-Provence, France, Sept. 19-21, 1967, 1-3
  - Nuclear Power Fuel Reprocessing: Technology and Economics, Augusta, Georgia, May 11-12, 1967, 152-53
  - Recent Advances in Reprocessing of Irradiated Fuels, New York, Nov. 30, 1967, 146
- Containment buildings**
  - electrical penetration systems, 5-12
- Control rods**
  - fast-neutron-induced bowing in ORR, 18-20
- Critical experiments**
  - analytical and experimental results of high conversion, 117-20
  - review of DIMPLE, 121-22
- Curium**
  - recovery from Shippingport Reactor fuel, 202-3
  - solvent extraction by tributyl phosphine oxide, 51

## D

- Duranickel 301**
  - corrosion by Br<sub>2</sub>, 152

## E

- Eurochemic Plant**
  - operating experience, 204-5

F

- Filters
  - operation experience in fluid-bed reactors, 214
- Fission products
  - recovery from wastes by solvent extraction, 111-12, 230
  - removal from PuFs and UFs, 56-59
- Fluoride-volatility process, 56-59, 101-6, 149-51, 209-16
- Fluorine
  - production costs, properties, storage, and disposal, 152
- Fuel blankets ( $\text{UO}_2$ )(Zircaloy clad)
  - aqueous processing, 93-94
- Fuel elements
  - mechanical analysis of irradiated, problems in, 13-15
- Fuels
  - burnup predictions in thermal reactors, 69-71
- Fuels (Al-U)
  - aqueous processing, 201
- Fuels (Al-U)(Al clad)
  - fluoride-volatility processing, 103-4
- Fuels (BeO-base)
  - aqueous processing, 144-45
- Fuels (graphite-base)
  - aqueous processing, 94
- Fuels ( $\text{LiF}-\text{BeF}_2-\text{UF}_4$ )
  - pyrochemical processing, 61-63, 99, 156-57, 221-24
- Fuels ( $\text{PuO}_2$ )
  - aqueous processing, 91
- Fuels ( $\text{PuO}_2-\text{UO}_2$ )
  - fluorination with fluorine, 210-11
- Fuels ( $\text{PuO}_2-\text{UO}_2$ )(stainless-steel clad)
  - aqueous processing, 50
  - salt-transport processing, 60-61, 96-99, 154-56, 219-21
- Fuels (Pu-U)(Mg-Zr clad)
  - decladding by melting, 100
- Fuels ( $\text{ThO}_2$ )
  - aqueous processing, 91-92
- Fuels [( $\text{Th},\text{U}$ ) $\text{C}_2$ ] ( $\text{PyC}$  coated)
  - aqueous processing, 92-93
- Fuels [ $(\text{Th},\text{U})\text{O}_2$ ] ( $\text{PyC}$  coated)
  - aqueous processing, 92-93
- Fuels (U-fissium)
  - aqueous processing, 201-2
- Fuels (U-Zr)(Zircaloy clad)
  - aqueous processing, 201-2
  - fluoride-volatility processing, 103-4, 209-10
- Fuels (UC)
  - oxidation and hydrofluorination of, 213
- Fuels (UC)(SAP clad)
  - decladding by aqueous process, 49
- Fuels ( $\text{UO}_2$ )
  - purification, 158
- Fuels ( $\text{UO}_2$ )(SAP clad)
  - decladding by aqueous process, 49
- Fuels ( $\text{UO}_2$ )(stainless-steel clad)
  - aquafluor processing, 54-56
  - fluoride-volatility processing, 101-3
- Fuels ( $\text{UO}_2$ )(304 stainless-steel clad)
  - critical experiments with 3 and 5 percent enriched, 117-20
- Fuels ( $\text{UO}_2$ )(6061T-6 Al clad)
  - critical experiments with 5 percent enriched, 117-20
- Fuels ( $\text{UO}_2$ )(Zircaloy clad)
  - fluoride-volatility processing, 101-3
- Fuels ( $\text{UO}_2$ -Mo pellets)
  - aqueous processing, 92
- Fuels ( $\text{UO}_2-\text{ZrO}_2$ )(Zircaloy clad)
  - aqueous processing, 93

H

- Fused-salt process
  - bibliography on, 216

L

- Halogens
  - physical and chemical properties of, 216
- Heat exchangers
  - vibrations in HFBR, flow induced, 20-21
- Huyck Felt metal
  - corrosion by Br<sub>2</sub>, 152

M

- Lanthanum
  - solvent extraction, 51
- Liquid metals
  - impurity monitoring by plugging meters, 138-43
  - valve development for, 127-37
- Lithium chloride systems ( $\text{LiCl}-\text{KCl}$ )
  - separation by zone melting and column crystallization, 63
- Lithium fluoride systems ( $\text{BeF}_2-\text{LiF}-\text{ThF}_4$ )
  - pyrochemical processing, 61-63, 99, 156-57, 221-24

N

- Magnesium alloys (Mg-Zr)
  - removal from Pu-U fuel elements by melting, 100
- Meters (plugging)
  - use in monitoring impurity levels in liquid sodium, 134-43
- Molybdenum alloys
  - preparation by pyrochemical process, 225
- Molybdenum fluorides
  - physical and thermodynamic properties, 152
  - syntheses, 152
- Molybdenum oxyfluorides
  - physical and thermodynamic properties, 152
  - syntheses, 152
- Molybdenum systems ( $\text{Mo}-\text{UO}_2$ )
  - aqueous processing, 92
- Monel
  - corrosion by Br<sub>2</sub>, 152
- Monel-400
  - corrosion by HF, 202

P

- Neptunium
  - production from  $\text{NpO}_2$ , 224
  - recovery from Purex wastes, 203
- Neptunium fluorides ( $\text{NpF}_6$ )
  - density, 152
  - long-wavelength, infrared-active fundamentals for, 152
  - removal from PuFs and UFs gas streams, 212-13
- Neutron generators
  - design of pulsed, 72-74
- Nickel 201
  - corrosion by Br<sub>2</sub>, 152
- Nitrofluor process
  - bibliography on, 216
  - processing of Zircaloy-clad  $\text{UO}_2$  fuels, 54
- Nonaqueous processing
  - Aquafluor process, 54-56
  - behavior of Np, 212-13

O

- Oak Ridge National Laboratory waste management, 164

R

- Plant and equipment
  - Allied Chemical Corporation announcement of new fuel-reprocessing plant construction, 205
  - Attila cell for processing MTR-type fuel elements, 103-4
  - characteristics of air-pulsed systems, 147-48
  - design of delayed-neutron monitor for  $^{238}\text{U}$  in leached hulls, 205-8
  - design of module for aqueous processing of irradiated fuels, 146-47
  - design and operation of stacked-clone liquid-liquid contactor, 51-53
  - design and operation of the WAK fuel-reprocessing plant, 94-95
  - Eurochemic Plant, operating experience, 204-5
  - performance of centrifugal mixer-settler, 205
- Plugging meters
  - use in monitoring impurity levels in liquid sodium, 138-43
- Plutonium
  - conversion to  $\text{PuO}_2$  by burning, 91
  - electrorefining, 158, 224
  - production from  $\text{PuO}_2$  by electrolysis, 99
  - purification by selective reduction in liquid BrF<sub>3</sub>, 106
  - recovery from Purex wastes, 203
  - recovery from scrap by fluoride-volatility process, 151-52
- Plutonium alloys (Pu-U)(Mg-Zr clad)
  - decladding by melting, 100
- Plutonium fluorides ( $\text{PuF}_6$ )
  - bibliography on, 216
  - long-wavelength, infrared-active fundamentals for, 152
  - preparation of, 216
  - properties of, 216
  - purification of, 57-59, 213-14
  - radiation decomposition, 151

separation from UF<sub>6</sub>, 214, 225  
thermal decomposition, 151  
Plutonium oxide (PuO<sub>2</sub>)  
conversion to Pu metal by electrolysis, 99  
dissolution in aqueous processing, 91  
preparation of, 216  
properties of, 216  
Plutonium oxide systems (Pu<sub>2</sub>UO<sub>7</sub>)  
fluorination with ClF and ClF<sub>3</sub>, 211-12  
Plutonium oxide systems (PuO<sub>2</sub>-UO<sub>2</sub>)  
(stainless-steel clad)  
processing in the NFS Purex facility, 50  
salt-transport processing, 60-61, 96-99,  
154-56, 219-21  
Polonium  
volatilization from bismuth oxide, 158  
Potassium chloride systems (LiCl-KCl)  
separation by zone melting and column  
crystallization, 63  
Potassium nitrate systems (KNO<sub>3</sub>-NaNO<sub>3</sub>)  
separation by zone melting and column  
crystallization, 63  
Protactinium  
physical chemistry of, 216-17  
solvent extraction, 51  
Pumps  
failure in Big Rock Point Reactor,  
21-22  
Purex process  
evaluation for stainless-steel-clad UO<sub>2</sub>-  
PuO<sub>2</sub> fuels, 50  
Purex wastes  
Np and Pu recovery from, 203  
Pyrochemical processing (compact), 60-63,  
96-100, 154-58, 219-25  
(see also Nonaqueous processing)

## R

Radioactive materials  
handling and shipping, 68  
heat-generation problems in fuel  
processing, 215  
Reactor control  
use of quasi-linear programming for,  
123-26  
Reactor coolants  
ejection mechanisms in LMFBR, use in  
analyzing safety of, 180-85  
liquid-metal impurity monitoring by  
plugging meters, 138-43  
superheating of liquid metals in fast  
reactors, 84-88  
Reactor dynamics  
study, adiabatic method for, 174  
study, direct method for, 176  
study, modal method for, 174  
study, nodal method for, 175  
study, point-reactor kinetics method for,  
173-74  
Reactor safety  
analysis of LMFBR, use of coolant ejection  
mechanisms in, 180-85  
electrical penetrations in containment  
buildings, 7-12  
fast reactors, conference on, 1-3  
fast reactors, superheating of liquid-  
metal coolant in, 84-88  
Reactor valves  
design for use in LMFBR, 127-37  
Reactors (Big Rock Point)  
circulation-pump seal failure, 21-22  
waste management, 230  
Reactors (Briseis)  
power-excursion experiments, 2  
Reactors (BR-5)  
operating experience, 3

Reactors (Cabri Swimming-Pool)  
core-meltdown experiments, 2  
Reactors (Calder Hall)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (DFR)  
intrinsic reactivity-noise sources in,  
169-70  
operating experience, 3  
Reactors (DMTR)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (Dresden 1)  
waste management, 230  
Reactors (Dresden 2)  
containment, electrical penetrations,  
7-12  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (EBR-II)  
fuel processing by aqueous techniques,  
201-2  
fuel processing by pyrochemical  
techniques, 158  
Reactors (Elk River)  
intrinsic reactivity-noise sources in,  
169-70  
waste management, 230  
Reactors (Enrico Fermi)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (fast)  
design of compact with heat pipes and  
direct converters, 187-200  
safety, conference on, 1-3  
Reactors (fast breeder)  
coolant ejection mechanisms, use in  
analyzing safety of, 180-85  
fuel processing by the salt-transport  
process, 60-61, 96-99, 154-56, 219-21  
superheating of liquid-metal coolant,  
84-88  
Reactors (Fermi)  
containment, electrical penetrations, 5-6  
operating experience, 3  
Reactors (Hanford Production)  
hydriding of Zircaloy-2 process tubes,  
17-18  
Reactors (HFBR)  
flow-induced vibrations in heat-exchanger  
tubes, 20-21  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (HFIR)  
intrinsic reactivity-noise sources in,  
169-70  
transuranium-element production, 50  
Reactors (HRE-2)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (HTR)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (Humboldt Bay)  
waste management, 230  
Reactors (Indian Point 1)  
waste management, 230  
Reactors (JRR-1)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (JRR-2)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (LMFBR)  
coolant ejection mechanism, use in  
analyzing safety of, 180-85  
large valves for, 127-37  
superheating of Na coolant, 84-88

Reactors (molten-salt breeder)  
corrosion tests, 224-25  
fuel processing by pyrochemical techniques, 99, 156-57  
Reactors (ML-1)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (MSBR)  
pyrochemical processing of fuels, 61-63  
Reactors (MTR)  
fuel processing, 103-4  
Reactors (NRU)  
replacement of Al vessel, plans for,  
22-24  
Reactors (ORR)  
Al-Cd shim safety rods, fast-neutron-  
induced bowing in, 18-20  
Be-Cd shim safety rods, fast-neutron-  
induced bowing in, 20  
bowing of Al lattice components from  
fast-neutron damage, 18-20  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (Pathfinder)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (Peach Bottom)  
containment, electrical penetrations, 6-7  
Reactors (power)  
noise experiments, analysis and theory  
of, 167-71  
Reactors (Rapsodie)  
operating experience, 3  
Reactors (Savannah)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (Saxton)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (Shippingport)  
Am and Cm recovery from fuels of, 202-3  
Reactors (SNAP-2)  
intrinsic reactivity-noise sources in,  
169-70  
Reactors (sodium-cooled fast)  
safety, conference on, 1-3  
Reactors (Texas A and M Univ. Swimming  
Pool)  
replacement of Al liner with stainless  
steel 304, 24-25  
Reactors (thermal)  
fuel-burnup predictions, panel pro-  
ceedings on, 69-71  
Reactors (TREAT)  
core-meltdown studies, 2  
Reactors (VBNR)  
intrinsic reactivity-noise source in,  
169-70  
Reactors (Yankee)  
waste management, 230  
Reactors (Zero Power)  
noise experiments, analysis and theory  
of, 167-71

## S

Safety  
(see Reactor safety)  
Salt mines  
storage of calcined wastes in, 110-11,  
159-63  
Salt-transport process, 60-61, 96-99, 154-  
56, 219-21  
Seals  
failure in Big Rock Point Reactor circu-  
lation pump, 21-22  
Sodium (liquid)  
behavior in reactor core accidents, 2

compressibility and sonic velocity, recommended values, 42-43  
density, recommended values, 27-28  
electrical resistivity, recommended values, 39-40  
impurity monitoring by plugging meters, 138-43  
saturation vapor pressure, recommended values, 28  
superheating in fast reactors, 84-88  
surface tension, recommended values, 40  
thermal-expansion coefficient, 40-42  
thermodynamic and P-V-T properties, recommended values, 28-35, 44-45  
transport properties, recommended values, 32, 36-39  
valve development for, 127-37  
vaporization in reactor accidents, 2

**Sodium nitrate systems ( $KNO_3-NaNO_3$ )**  
separation by zone melting and column crystallization, 63

**Solvent extraction**  
of actinide elements, 50-51  
air-pulsed systems for, characteristics of, 147-48  
design and operation of centrifugal mixer-settler, 205  
design and operation of stacked-clone liquid-liquid contactors, 51-53  
deterioration of solvents under irradiation, 203-4  
fission-product recovery from wastes by, 111-12  
**Space program**  
design of compact power generator featuring a fast reactor, heat pipes and direct converters, 187-200

**Stainless steel (304)**  
performance in NaK at high temperatures, 67

**Stainless steel (304L)**  
corrosion by HF, 202

**Stainless steel (316)**  
performance in NaK at high temperatures, 67

**Stainless steel (348)**  
performance in NaK at high temperatures, 67

**Stainless steel (430)**  
corrosion by Pb-Bi eutectic, 158

**Srontium**  
removal from liquid wastes by solvent extraction, 111-12

**Symposia**  
(see Conferences and meetings)

**T**

**Thermoelectric power generators**  
design of compact featuring a fast reactor, heat pipes and direct converters, 187-200

**Thorium**  
solvent extraction by tributyl phosphine oxide, 51

**Thorium carbide systems [( $Th,U$ ) $C_2$ ] (PyC coated)**  
dissolution in aqueous processing, 92-93

**Thorium chloride ( $ThCl_4$ )**  
production, 100

**Thorium fluoride systems ( $BeF_3-LiF-ThF_4$ )**  
pyrochemical processing, 61-63

**Thorium oxide ( $ThO_2$ )**  
dissolution in aqueous processing, 91-92

reduction with Ca, 100, 224  
**Thorium oxide systems ( $(Th,U)O_2$ )**  
aqueous processing in BeO matrix, 144-46  
**Thorium oxide systems [( $Th,U$ ) $O_2$ ] (PyC coated)**  
dissolution in aqueous processing, 92-93

**Transuranium elements**  
production in the HFIR, recovery in the TRU, 50

**Transuranium Facility (TRU)**  
operation, 50

**U**

**Uranium-233**  
solvent extraction, 51

**Uranium-235**  
monitoring in leached hulls, design of instrument for, 205-8

**Uranium alloys (Al-U)**  
dissolution by  $HNO_3$ , effect of Si on, 201

**Uranium alloys (Al-U) (Al clad)**  
fluoride-volatility processing of, 103-4

**Uranium alloys (Mo-U)**  
preparation by pyrochemical process, 225

**Uranium alloys (Pu-U)(Mg-Zr clad)**  
decladding by melting, 100

**Uranium alloys (U-Zr) (Zircaloy clad)**  
fluoride-volatility processing, 103-4  
corrosion problems in processing with HF, 202

**Uranium carbides (UC)**  
oxidation and hydrofluorination, 213

**Uranium carbides (UC)(SAP clad)**  
decladding by chemical dissolution, 49

**Uranium carbides (UC<sub>2</sub>)**  
conversion to UF<sub>6</sub>, 105

**Uranium chlorides (UCl<sub>4</sub>)**  
fission-product removal by zone melting, 63

**Uranium fluoride systems ( $BeF_3-LiF-UF_4$ )**  
pyrochemical processing, 61-63

**Uranium fluorides (UF<sub>4</sub>)**  
conversion to UF<sub>6</sub>, 105  
preparation and properties, 216  
reaction with water vapor and O<sub>2</sub>, 216

**Uranium fluorides (UF<sub>6</sub>)**  
bibliography on, 216  
conversion to UO<sub>2</sub>, bibliography on, 152  
density of liquid, 152  
handling and container criteria, 104-5  
long-wavelength, infrared-active fundamentals for, 152  
preparation and properties, 216  
preparation from UC<sub>2</sub> and U<sub>3</sub>O<sub>8</sub>F<sub>8</sub>, 105  
purification, 56-58, 213  
 purity specifications for enrichment by gaseous diffusion, 57  
 separation from PuF<sub>6</sub>, 214, 225  
 structure, 105

**Uranium oxide systems (Mo- $UO_2$ )**  
aqueous processing, 92

**Uranium oxide systems ( $Pu,U$ ) $O_2$**   
fluorination with ClF and ClF<sub>3</sub>, 211-12

**Uranium oxide systems (PuO<sub>2</sub>- $UO_2$ )**  
fluorination with fluorine, 210-11  
salt-transport processing, 96-99

**Uranium oxide systems ( $PuO_2-UO_2$ )**  
(stainless-steel clad)  
processing in the NFS Purex facility, 50  
salt-transport processing, 60-61, 96-99, 154-56, 219-21

**Uranium oxide systems ( $(Th,U)O_2$ )**  
aqueous processing in BeO matrix, 144-

152  
coated)  
dissolution in aqueous processing, 92-93

**Uranium oxide systems ( $UO_2-ZrO_2$ )**  
(Zircaloy clad)  
dissolution in aqueous processing, 93

**Uranium oxides ( $UO_2$ )**  
preparation, 216  
preparation from UF<sub>6</sub>, bibliography on, 152

preparation of crystals, 225  
properties, 216  
purification, 158  
reaction with BrF<sub>3</sub>, kinetics of, 215-16  
reaction with F, kinetics of, 216  
reaction with ClF, kinetics of, 216

**Uranium oxides ( $UO_2$ )(304 stainless steel clad)**  
critical experiments with 3 and 5 percent enriched, 117-20

**Uranium oxides ( $UO_2$ )(6061T-6 Al clad)**  
critical experiments with 5 percent enriched, 117-20

**Uranium oxides ( $UO_2$ )(SAP clad)**  
decladding by chemical dissolution, 49

**Uranium oxides ( $UO_2$ )(stainless-steel clad)**  
Aquaflour processing, 54-56

fluoride-volatility processing, 101-3

**Uranium oxides ( $UO_2$ )(Zircaloy clad)**  
decladding and dissolution in aqueous processing, 93

fluoride-volatility processing, 101-3,

209-10

Nitrofluor processing, 54

**Uranium oxides ( $UO_2$ )(Zr clad)**

Aquaflour processing, 54-56

**Uranium oxides ( $UO_2$ )**

preparation and properties, 216

reaction with BrF<sub>3</sub>, kinetics of, 215-16

**Uranium oxides ( $U_3O_8$ )**

preparation and properties of, 216

reaction with BrF<sub>3</sub>, kinetics of, 215-16

reaction with ClF, 216

reduction by Ca vapor, 224

**Uranium oxyfluoride ( $UO_2F_3$ )**

conversion to UF<sub>6</sub>, 105

**Uranium oxyfluoride ( $U_3O_8F_8$ )**

conversion to UF<sub>6</sub>, 105

**V****Valves**

design for use in liquid-metal-cooled reactors, 127-37

**Vibrations**

flow-induced in HFBR heat exchangers, 20-21

**Volatility processes**, 54-59, 101-6, 149-53,

209-17

(see also Nonaqueous processing)

**W****Waste disposal**

categorization of wastes, 114-15

conversion of high-level-activity wastes to solids, 65-68, 159, 107-10, 159, 227-30, 231

final disposal methods, 159-64

fission-product recovery, bibliography on, 231

fission-product recovery by solvent extraction, 111-12

ground disposal, symposium on, 230

methods at CRNL, 164

methods at ORNL, 164

methods at various power reactors, 230

recovery of Cs by solvent extraction, 111-12, 230  
research and development, 107-15  
storage of calcined wastes in salt mines, 110-11, 159-64  
storage of liquid wastes in geologic formations, 163-64  
storage of liquid wastes in tanks, 112, 230

Y

Yttrium production by fused-salt electrorefining, 99

Z

Zinc-65 extraction from pure Zn and Zn-Pb alloys, 157-58

Zircaloy-2 hydriding of process tubes in Hanford Production Reactors, 17-18  
Zirconium alloys (Mg-Zr) removal from Pu-U fuel elements by melting, 100  
Zirconium alloys (U-Zr)(Zircaloy clad) fluoride-volatility processing, 103-4  
Zirconium oxide systems (UO<sub>2</sub>-ZrO<sub>2</sub>) (Zircaloy clad) dissolution in aqueous processing, 93

**LEGAL NOTICE**

This journal was prepared under the sponsorship of the U. S. Atomic Energy Commission. Neither the United States, nor the Commission, nor any person acting on behalf of the Commission:

A. Makes any warranty or representation, expressed or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this journal, or that the use of any information, apparatus, method, or process disclosed in this journal may not infringe privately owned rights; or

B. Assumes any liabilities with respect to the use of, or for damages resulting from the use of any information, apparatus, method, or process disclosed in this journal.

As used in the above, "person acting on behalf of the Commission" includes any employee or contractor of the Commission, or employee of such contractor, to the extent that such employee or contractor of the Commission, or employee of such contractor prepares, disseminates, or provides access to, any information pursuant to his employment or contract with the Commission, or his employment with such contractor.